#### 106TH CONGRESS 1ST SESSION

## H. R. 3161

To provide for continuation of the Federal research investment in a fiscally sustainable way, and for other purposes.

#### IN THE HOUSE OF REPRESENTATIVES

OCTOBER 28, 1999

Mrs. Wilson (for herself, Mr. Dingell, Mr. Cook, Ms. Eshoo, Mr. Franks of New Jersey, Mr. Holt, Ms. Lofgren, Mr. Maloney of Connecticut, Mr. Rogan, and Mrs. Tauscher) introduced the following bill; which was referred to the Committee on Science, and in addition to the Committees on Commerce, Armed Services, Resources, and Agriculture, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned

## A BILL

To provide for continuation of the Federal research investment in a fiscally sustainable way, and for other purposes.

- 1 Be it enacted by the Senate and House of Representa-
- 2 tives of the United States of America in Congress assembled,
- 3 SECTION 1. SHORT TITLE.
- 4 This Act may be cited as the "Federal Research In-
- 5 vestment Act".

#### 1 SEC. 2. GENERAL FINDINGS REGARDING FEDERAL INVEST-

2	MENT IN RESEARCH.
3	(a) VALUE OF RESEARCH AND DEVELOPMENT.—The
4	Congress makes the following findings with respect to the
5	value of research and development to the United States:
6	(1) Federal investment in research has resulted
7	in the development of technology that saved lives in
8	the United States and around the world.
9	(2) Research and development investment
10	across all Federal agencies has been effective in cre-
11	ating technology that has enhanced the American
12	quality of life.
13	(3) The Federal investment in research and de-
14	velopment conducted or underwritten by both mili-
15	tary and civilian agencies has produced benefits that
16	have been felt in both the private and public sector.
17	(4) Discoveries across the spectrum of scientific
18	inquiry have the potential to raise the standard of
19	living and the quality of life for all Americans.
20	(5) Science, engineering, and technology play a
21	critical role in shaping the modern world.
22	(6) Approximately half of all United States
23	post-World War II economic growth is a direct re-
24	sult of technical innovation; and science, engineer-
25	ing, and technology contribute to the creation of new

goods and services, new jobs and new capital.

- 1 (7) Technical innovation is the principal driving 2 force behind the long-term economic growth and in-3 creased standards of living of the world's modern in-4 dustrial societies. Other nations are well aware of 5 the pivotal role of science, engineering, and tech-6 nology, and they are seeking to exploit it wherever 7 possible to advance their own global competitiveness.
  - (8) Historically, Federal investment in science, engineering, and technology was largely justified by the needs of national security or public health. America's Federal spending in precompetitive science, engineering, and technology is fully justified without relying on a compelling national security need.
- 15 (b) STATUS OF THE FEDERAL INVESTMENT.—The
  16 Congress makes the following findings with respect to the
  17 status of the Federal Investment in research and develop18 ment activities:
  - (1) Federal investment of approximately 13 to 14 percent of the Federal discretionary budget in research and development over the past 11 years has resulted in a doubling of the nominal amount of Federal funding.
- 24 (2) The increase in national dependency on 25 technology, the greater breadth of meaningful re-

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- 1 search opportunities, and the continuing need to be 2 fiscally responsible demands that Congress guide the 3 Federal Government's role in science, engineering, and technology in a manner that ensures a prudent use of public resources. Many indicators show that 5 more funding for science, engineering, and tech-6 7 nology is needed but, even with increased funding, 8 priorities must be established among different pro-9 grams. Congress must ensure that Federal research 10 and development investment are justified with long 11 term results to Americans.
- 12 (3) Current projections of Federal research 13 funding show a downward trend.

#### 14 SEC. 3. SPECIAL FINDINGS REGARDING HEALTH-RELATED

- 15 RESEARCH.
- The Congress makes the following findings with rerelated research:
- 18 (1) Health and economic benefits pro-19 VIDED BY HEALTH-RELATED RESEARCH.—Because 20 of health-related research, cures for many debili-21 tating and fatal diseases have been discovered and 22 deployed. At present, the medical research commu-23 nity is on the cusp of creating cures for a number 24 of leading diseases and their associated burdens. In 25 particular, medical research has the potential to de-

- velop treatments that can help manage the escalating costs associated with the aging of the United States population.
  - (2) Funding of Health-Related Research.—Many studies have recognized that clinical and basic science are in a state of crisis because of a failure of resources to meet the opportunity. Consequently, health-related research has emerged as a national priority and has been given significantly increased funding by Congress in fiscal year 1999. In order to continue addressing this urgent national need, the pattern of substantial budgetary expansion begun in fiscal year 1999 should be maintained.
  - (3) Interdisciplinary nature of health-Related research.—Because all fields of science and engineering are interdependent, full realization of the nation's historic investment in health will depend on major advances both in the biomedical sciences and in other science and engineering disciplines. Hence, the vitality of all disciplines must be preserved, even as special considerations are given to the health research field.

#### 1 SEC. 4. ADDITIONAL FINDINGS REGARDING THE LINK BE-

- 2 TWEEN THE RESEARCH PROCESS AND USE-
- 3 FUL TECHNOLOGY.

- The Congress makes the following findings:
- 5 (1) Interrelationship of science, engi-6 NEERING, AND TECHNOLOGY.—Science, engineering, 7 and technology rely on many overlapping and inter-8 related processes. The present Federal science, engi-9 neering, and technology structure reinforces the in-10 creasingly artificial distinctions between basic and 11 applied activities. Such structure is based upon a 12 model of sequential transition from basic research 13 through development to focused application that no 14 longer adequately captures the dynamic research and 15 innovation. The result too often is a set of discrete 16 Federal programs that each support a narrow phase 17 of research or development. There is less inter-18 disciplinary interaction than there might be and 19 some promising discoveries or technologies are not 20 pursued because they are outside the scope of the 21 sponsoring Federal program. The government should 22 maximize its research investment by identifying 23 areas of priority interest in science, engineering, and 24 technology from the earliest stages of research up to 25 a precommercialization stage, through funding agen-26 cies and vehicles appropriate for each stage.

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(2) Excellence in the american research INFRASTRUCTURE.—Federal investment in science, engineering, and technology programs must foster a close relationship between research and education. Investment in research at the university level creates more than simply world-class research. It creates world-class researchers as well as engineers, scientists, and technicians able to apply the fruits of research in the world economy. The Federal strategy must continue to reflect this commitment to a strong geographically-diverse research infrastructure. Furthermore, the United States must use the excellence of its university system to inspire primary and secondary students to pursue further study in math, science, and engineering, and to strengthen the curricula of primary and secondary schools in math and science.

(3) COMMITMENT TO A BROAD RANGE OF RE-SEARCH INITIATIVES.—An increasingly common theme in many recent technical breakthroughs has been the importance of revolutionary innovations that were sparked by overlapping of research disciplines. The most valuable work is often at the boundaries between fields. The United States must continue to encourage this trend by providing and

- encouraging opportunities for interdisciplinary projects that foster collaboration among fields of research.
- (4) Partnerships among industry, univer-5 SITIES, AND FEDERAL LABORATORIES.—Each of 6 these contributors to the national science and tech-7 nology delivery system has special talents and abili-8 ties that complement the others. In addition, each 9 has a central mission that must provide their focus 10 and each has limited resources. The nation's invest-11 ment in science, engineering, and technology can be 12 optimized by seeking opportunities for leveraging the 13 resources and talents of these 3 sectors through 14 partnerships that do not distort the missions of each 15 partner. For that reason, Federal dollars are wisely 16 spent forming such partnerships.

### 17 SEC. 5. MAINTENANCE OF FEDERAL RESEARCH EFFORT; 18 GUIDING PRINCIPLES.

- 19 (a) Maintaining United States Leadership in 20 Science, Engineering, and Technology.—It is im-21 perative for the United States to nurture its superb re-
- 22 sources in science, engineering, and technology carefully
- 23 in order to maintain its own globally competitive position.

- 1 (b) Guiding Principles.—Federal research and de-2 velopment programs should be conducted in accordance 3 with the following guiding principles:
  - (1) Good science.—Federal science, engineering, and technology programs include both knowledge-driven science together with its applications, and mission-driven, science-based requirements. In general, both types of programs must be focused, peer- and merit-reviewed, and not unnecessarily duplicative, although the details of these attributes must vary with different program objectives.
    - (2) FISCAL ACCOUNTABILITY.—The Congress must exercise oversight to ensure that programs funded with scarce Federal dollars are well managed. The United States cannot tolerate waste of money through inefficient management techniques, whether by government agencies, by contractors, or by Congress itself. Fiscal resources would be better utilized if program and project funding levels were predictable across several years to enable better project planning; a benefit of such predictability would be that agencies and Congress can better exercise oversight responsibilities through comparisons of a project's and program's progress against carefully planned milestones.

States needs to make sure that government programs achieve their goals. As the Congress crafts science, engineering, and technology legislation, it must include a process for gauging program effectiveness, selecting criteria based on sound scientific judgment and avoiding unnecessary bureaucracy. The Congress should also avoid the trap of measuring the effectiveness of a broad science, engineering, and technology program by passing judgment on individual projects. Lastly, the Congress must recognize that a negative result in a well-conceived and executed project or program may still be critically important to the funding agency.

(4) Criteria for Government funding.—
Program selection for Federal funding should continue to reflect the nation's 2 traditional research and development priorities: (A) basic, scientific, and technological research that represents investments in the nation's long-term future scientific and technological capacity, for which government has traditionally served as the principal resource; and (B) mission research investments, that is, investments in research that derive from necessary public functions, such as defense, health, education, environmental

protection, and raising the standard of living, which 1 2 may include precommercial, precompetitive engineer-3 ing research and technology development. Additionally, government funding should not compete with or displace the short-term, market-driven, and typi-5 6 cally more specific nature of private-sector funding. 7 Government funding should be restricted 8 precompetitive activities, leaving competitive activi-9 ties solely for the private sector. As a rule, the gov-10 ernment should not invest in commercial technology 11 that is in the product development stage, very close 12 to the broad commercial marketplace, except to meet 13 a specific agency goal. When the government pro-14 vides funding for any science, engineering, and tech-15 nology investment program, it must take reasonable 16 steps to ensure that the potential benefits derived 17 from the program will accrue broadly.

#### 18 SEC. 6. POLICY STATEMENT.

- 19 (a) POLICY.—This Act is intended to—
- 20 (1) assure a base level of Federal funding for 21 basic scientific, biomedical, and precompetitive engi-22 neering research;
- 23 (2) invest in the future economic growth of the 24 United States by expanding the research activities 25 referred to in paragraph (1);

1	(3) enhance the quality of life and health for all
2	people of the United States through expanded sup-
3	port for health-related research;
4	(4) guarantee the leadership of the United
5	States in science, engineering, medicine, and tech-
6	nology; and
7	(5) ensure that the opportunity and the support
8	for undertaking good science is widely available
9	throughout the United States by supporting a geo-
10	graphically-diverse research and development enter-
11	prise.
12	(b) AGENCIES COVERED.—The agencies intended to
13	be covered to the extent that they are engaged in science,
14	engineering, and technology activities for basic scientific,
15	medical, or precompetitive engineering research by this
16	Act are—
17	(1) the National Institutes of Health, within the
18	Department of Health and Human Services;
19	(2) the National Science Foundation;
20	(3) the National Institute of Standards and
21	Technology, within the Department of Commerce;
22	(4) the National Aeronautics and Space Admin-
23	istration;
24	(5) the National Oceanic and Atmospheric Ad-
25	ministration, within the Department of Commerce;

1	(6) the Centers for Disease Control, within the
2	Department of Health and Human Services;
3	(7) the Department of Energy (to the extent
4	that it is engaged in non-defense-related activities);
5	(8) the Department of Agriculture;
6	(9) the Department of Transportation;
7	(10) the Department of the Interior;
8	(11) the Department of Veterans Affairs;
9	(12) the Smithsonian Institution;
10	(13) the Department of Education;
11	(14) the Environmental Protection Agency; and
12	(15) the Food and Drug Administration, within
13	the Department of Health and Human Services.
14	(c) FUTURE FISCAL YEAR ALLOCATIONS.—
15	(1) Goals.—The long-term strategy for re-
16	search and development funding under this section
17	would be achieved by a steady annual increase above
18	the rate of inflation so that by fiscal year 2010, 2.6
19	percent of the Federal budget is spent on non-de-
20	fense research and development.
21	(2) Authorization.—There are authorized to
22	be appropriated for civilian research and develop-
23	ment in the agencies listed in subsection (b)—
24	(A) \$39,790,000,000 for fiscal year 2000;
25	(B) \$41,980,000,000 for fiscal year 2001;

1	(C) \$44,290,000,000 for fiscal year 2002;
2	(D) \$46,720,000,000 for fiscal year 2003;
3	(E) \$49,290,000,000 for fiscal year 2004;
4	(F) \$52,000,000,000 for fiscal year 2005;
5	(G) \$54,870,000,000 for fiscal year 2006;
6	(H) \$57,880,000,000 for fiscal year 2007;
7	(I) \$61,070,000,000 for fiscal year 2008;
8	(J) \$64,420,000,000 for fiscal year 2009;
9	and
10	(K) \$67,970,000,000 for fiscal year 2010.
11	(3) Acceleration to meet national
12	NEEDS.—
13	(A) In general.—If the amount appro-
14	priated for any fiscal year to an agency for the
15	purposes stated in paragraph (2) increases by
16	more than 8 percent over the amount appro-
17	priated to it for those purposes for the pre-
18	ceding fiscal year, then the amounts authorized
19	by paragraph (2) for subsequent fiscal years for
20	that agency and other agencies shall be deter-
21	mined under subparagraphs (B) and (C).
22	(B) EXCLUSION OF AGENCY IN DETER-
23	MINING OTHER AGENCY AMOUNTS FOR NEXT
24	FISCAL YEAR.—For the next fiscal year after a
25	fiscal year described in subparagraph (A), the

amount authorized to be appropriated to other agencies under paragraph (2) shall be determined by excluding the agency described in subparagraph (A). Any amount that would, but for this subparagraph, be authorized to be appropriated to that agency shall not be appropriated.

- (C) Resumption of Regular Treat-Ment.—Notwithstanding subparagraph (B), an agency may not be excluded from the determination of the amount authorized to be appropriated under paragraph (2) for a fiscal year following a fiscal year for which the sum of the amounts appropriated to that agency for fiscal year 2000 and all subsequent fiscal years for the purposes described in paragraph (2) does not exceed the sum of—
  - (i) the amount appropriated to that agency for such purposes for fiscal year 2000; and
  - (ii) the amounts that would have been appropriated for such purposes for subsequent fiscal years if the goal described in paragraph (1) had been met (and not ex-

- 1 ceeded) with respect to that agency's fund-
- 2 ing.
- 3 (D) NO LIMITATION ON OTHER FUND-
- 4 ING.—Nothing in this paragraph limits the
- 5 amount that may be appropriated to any agency
- for the purposes described in paragraph (2).
- 7 (d) Conformance With Budgetary Caps.—Not-
- 8 withstanding any other provision of law, no funds may be
- 9 made available under this Act in a manner that does not
- 10 conform with the discretionary spending caps provided in
- 11 the most recently adopted concurrent resolution on the
- 12 budget.
- 13 (e) Balanced Research Portfolio.—Because of
- 14 the interdependent nature of the scientific and engineering
- 15 disciplines, the aggregate funding levels authorized by this
- 16 section assume that the Federal research portfolio will be
- 17 well-balanced among the various scientific and engineering
- 18 disciplines, and geographically dispersed throughout the
- 19 States.
- 20 SEC. 7. PRESIDENT'S ANNUAL BUDGET REQUEST.
- 21 The President of the United States shall, in coordina-
- 22 tion with the President's annual budget request, include
- 23 a report that parallels Congress' commitment to support
- 24 federally-funded research and development by providing—

- 1 (1) a detailed summary of the total level of 2 funding for research and development programs 3 throughout all civilian agencies;
  - (2) a focused strategy that reflects the funding projections of this Act for each future fiscal year until 2010, including specific targets for each agency that funds civilian research and development;
  - (3) an analysis which details funding levels across Federal agencies by methodology of funding, including grant agreements, procurement contracts, and cooperative agreements (within the meaning given those terms in chapter 63 of title 31, United States Code); and
- 14 (4) specific proposals for infrastructure develop15 ment and research and development capacity build16 ing in States with less concentrated research and de17 velopment resources in order to create a nationwide
  18 research and development community.

# 19 SEC. 8. COMPREHENSIVE ACCOUNTABILITY STUDY FOR 20 FEDERALLY-FUNDED RESEARCH.

21 (a) STUDY.—The Director of the Office of Science 22 and Technology Policy, in consultation with the Director 23 of the Office of Management and Budget, shall enter into 24 agreement with the National Academy of Sciences for the 25 Academy to conduct a comprehensive study to develop

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1	methods for evaluating federally-funded research and de-
2	velopment programs. This study shall—
3	(1) recommend processes to determine an ac-
4	ceptable level of success for federally-funded re-
5	search and development programs by—
6	(A) describing the research process in the
7	various scientific and engineering disciplines
8	and characterizing how these processes evolved;
9	(B) describing in the different sciences
10	what measures and what criteria each commu-
11	nity uses to evaluate the success or failure of a
12	program, and on what time scales these meas-
13	ures are considered reliable—both for explor-
14	atory long-range work and for short-range
15	goals; and
16	(C) recommending how these measures
17	may be adapted for use by the Federal govern-
18	ment to evaluate federally-funded research and
19	development programs;
20	(2) assess the extent to which agencies incor-
21	porate independent merit-based review into the for-
22	mulation of the strategic plans of funding agencies
23	and if the quantity or quality of this type of input

is satisfactory;

1	(3) recommend mechanisms for identifying fed-
2	erally-funded research and development programs
3	which are unsuccessful or unproductive;
4	(4) evaluate the extent to which independent,
5	merit-based evaluation of federally-funded research
6	and development programs and projects achieves the
7	goal of eliminating unsuccessful or unproductive pro-
8	grams and projects;
9	(5) investigate and report on the validity of
10	using quantitative performance goals for aspects of
11	programs which relate to administrative manage-
12	ment of the program and for which such goals would
13	be appropriate, including aspects related to—
14	(A) administrative burden on contractors
15	and recipients of financial assistance awards;
16	(B) administrative burdens on external
17	participants in independent, merit-based evalua-
18	tions;
19	(C) cost and schedule control for construc-
20	tion projects funded by the program;
21	(D) the ratio of overhead costs of the pro-
22	gram relative to the amounts expended through
23	the program for equipment and direct funding
24	of research; and

1	(E) the timeliness of program responses to
2	requests for funding, participation, or equip-
3	ment use;
4	(6) examine the extent to which program selec-
5	tion for Federal funding across all agencies exempli-
6	fies our nation's historical research and development
7	priorities—
8	(A) basic, scientific, and technological re-
9	search in the long-term future scientific and
10	technological capacity of the nation; and
11	(B) mission research derived from a high-
12	priority public function; and
13	(7) examine the conceptual scientific model
14	which assumes a progression from basic research
15	through technological application, including—
16	(A) whether it adequately describes the
17	process of scientific discovery and innovation at
18	the cusp of the 21st century;
19	(B) whether it encourages an investment
20	strategy or research infrastructure that hinders
21	discovery and innovation;
22	(C) whether there is a better model which
23	is likely to yield improved results; and

- 1 (D) what changes would need to be made 2 in Federal funding mechanisms, agencies, and
- 4 (b) ALTERNATIVE FORMS FOR PERFORMANCE

programs to align with this different model.

- 5 GOALS.—Not later than 6 months after transmitting the
- 6 report under subsection (a) to Congress, the Director of
- 7 the Office of Management and Budget, after public notice,
- 8 public comment, and approval by the Director of the Of-
- 9 fice of Science and Technology Policy and in consultation
- 10 with the National Science and Technology Council shall
- 11 promulgate one or more alternative forms for performance
- 12 goals under section 1115(b)(1)(B) of title 31, United
- 13 States Code, based on the recommendations of the study
- 14 under subsection (a) of this section. The head of each
- 15 agency containing a program activity that is a research
- 16 and development program may apply an alternative form
- 17 promulgated under this section for a performance goal to
- 18 such a program activity without further authorization by
- 19 the Director of the Office of Management and Budget.
- 20 (c) STRATEGIC PLANS.—Not later than 1 year after
- 21 promulgation of the alternative performance goals in sub-
- 22 section (b) of this section, the head of each agency car-
- 23 rying out research and development activities, upon updat-
- 24 ing or revising a strategic plan under subsection 306(b)
- 25 of title 5, United States Code, shall describe the current

and future use of methods for determining an acceptable level of success as recommended by the study under sub-3 section (a). 4 (d) Definitions.—In this section: (1) Program activity.—The term "program" 6 activity" has the meaning given that term by section 7 1115(f)(6) of title 31, United States Code. 8 (2)INDEPENDENT MERIT-BASED EVALUA-TION.—The term "independent merit-based evalua-9 10 tion" means review of the scientific or technical 11 quality of research or development, conducted by ex-12 perts who are chosen for their knowledge of sci-13 entific and technical fields relevant to the evaluation 14 and who— 15 (A) in the case of the review of a program 16 activity, do not derive long-term support from 17 the program activity; or 18 (B) in the case of the review of a project 19 proposal, are not seeking funds in competition 20 with the proposal. 21 (e) AUTHORIZATION OF APPROPRIATIONS.—There 22 are authorized to be appropriated to carry out the study 23 required by subsection (a) \$600,000 for the 18-month pe-

riod beginning October 1, 2000.

#### 1 SEC. 9. EFFECTIVE PERFORMANCE ASSESSMENT PROGRAM

- 2 FOR FEDERALLY-FUNDED RESEARCH.
- 3 (a) IN GENERAL.—Chapter 11 of title 31, United
- 4 States Code, is amended by adding at the end thereof the
- 5 following:

#### 6 "§ 1120. Accountability for research and develop-

- 7 ment programs
- 8 "(a) Identification of Unsuccessful Pro-
- 9 GRAMS.—Based upon program performance reports for
- 10 each fiscal year submitted to the President under section
- 11 1116, the Director of the Office of Management and
- 12 Budget shall identify the civilian research and develop-
- 13 ment program activities, or components thereof, which do
- 14 not meet an acceptable level of success as defined in sec-
- 15 tion 1115(b)(1). Not later than 30 days after the submis-
- 16 sion of the reports under section 1116, the Director shall
- 17 furnish a copy of a report listing the program activities
- 18 or component identified under this subsection to the Presi-
- 19 dent and the Congress.
- 20 "(b) Accountability If No Improvement
- 21 Shown.—For each program activity or component that
- 22 is identified by the Director under subsection (a) as being
- 23 below the acceptable level of success for 2 fiscal years in
- 24 a row, the head of the agency shall, no later than 30 days
- 25 after the Director submits the second report so identifying

1	the program, submit to the appropriate congressional com-
2	mittees of jurisdiction—
3	"(1) a concise statement of the steps necessary
4	to—
5	"(A) bring such program into compliance
6	with performance goals; or
7	"(B) terminate such program should com-
8	pliance efforts fail; and
9	"(2) any legislative changes needed to put the
10	steps contained in such statement into effect.".
11	(b) Conforming Amendments.—
12	(1) The chapter analysis for chapter 11 of title
13	31, United States Code, is amended by adding at
14	the end thereof the following:
	"1120. Accountability for research and development programs.".
15	(2) Section 1115(f) of title 31, United States
16	Code, is amended by striking "through 1119" and
17	inserting "through 1120".